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A whole school approach to SFL metalanguage and the explicit teaching of language for curriculum learning

1. INTRODUCTION

In keeping with the theme of this special edition, the present paper aims to examine the benefit of the explicit teaching of language for curriculum learning (LCL) informed by Systemic Functional Linguistics (SFL) across several disciplines at one school in the UK. The UK's Department for Education's (DfE) states that language is 'at the heart of our culture and ... the medium in which most of our pupils think and communicate' (DfE, 2013: 4). As such, language is the primary resource for meaning making in all disciplines within a school. However, as suggested by Bourdieu & Passeron (1990: 115) academic language is 'never anyone's mother tongue' and access to ways of knowing through academic language, the language of schooling depends on understanding the language of particular subject areas, which is often referred to as disciplinary literacy. Disciplinary literacy is seen as 'linguistic systems relevant to the ways different school subjects foreground particular meanings through their discursive practices and favoured genres' (Schleppegrell, 2018: 5). Disciplinary literacy is a challenge for all learners regardless of their cultural and linguistic background, and as often suggested all teachers in all disciplines should be involved in talk about language and meaning in their classroom (see, Humphrey, 2017; Macken-Horarik, Love, Sandiford & Unsworth, 2017; Polias, 2016; Rose & Martin 2012, Schleppegrell, 2013, 2018, among others). Disciplinary literacy and how to teach it, is unfortunately often absent from teacher education programmes (Fang & Coatam, 2013; Schleppegrell, 2018).

The need for improved language and literacy for all learners was identified by the Senior Leadership Team at The School where the present study took place (in order to anonymise the school involved in the study, 'The School' will be used instead of the name of the school). In addition, language and literacy was also recognised as an area for improvement during an Office for Standards in Education (OFSTED, a Government body which focuses on the assessment of quality and standards in schools) inspection at The School. The OFSTED report stated, 'many pupils struggled to improve their verbal responses in lessons and their explanations in their written work, resulting in lower marks in examinations, particularly in history, geography and in physical education' (OFSTED, 2016). The Senior Leadership Team, after trying a range of workshops and initiatives, decided to introduce a whole school approach to language and literacy informed by Systemic Functional Linguistics (SFL). SFL was selected as it provides a social semiotic perspective of language and literacy development that attends to text/context dynamics in schools (see, Halliday, 1993). The School offered SFL informed professional development (PD) for their teachers.

SFL metalanguage was adopted and embedded in a range of different disciplines. Metalanguage, talk about language, or as Gebhard, Chen, Britton and Graham (2014: 107) state metalanguage is 'conscious awareness, articulated, and used reflexively as a cognitive tool to construct knowledge about language'. Metalanguage is seen as a 'powerful navigational toolkit for teachers... that will enable us to move forward rather than backward,

to engage with complex social semiotic practices, to diagnose strengths and weaknesses in students' texts, relating them in a principled way to the relevant meaning potentials on which they draw' (Macken-Horarik, 2008, p. 46). Bourke (2005: 93) disagrees and states that the use of metalanguage should be viewed as 'complex jargon' because at times it is over-technical and hinders learning. However, the present paper supports the position that metalanguage is a 'powerful navigational toolkit', and explores how teachers and students at one school, over time, made sense of and learned to explicitly use SFL metalanguage in order to improve teaching and learning. The research question addressed in this paper is:

- How do teachers explicitly teach LCL through the use of SFL-informed metalinguistic resources such as register, periodicity and nominalisation in their classroom?

By focusing on three metalinguistic resources, register, nominalisation and periodicity, the findings shed light on understanding language as functional, illustrating how knowledge is constructed through language and that ways of knowing, meaning, doing, speaking and writing vary across disciplines. Register, nominalization and periodicity were chosen as they were identified by the teachers at The School through a questionnaire as SFL metalinguistic features they were familiar with and used in their classroom (see Figure 2).

First, the theoretical concept of SFL and in particular register, nominalization and periodicity are introduced. Then, the methodology adopted is outlined before discussing specific examples of how teachers made sense of and used register, nominalization and periodicity in a range of disciplines.

1.1 Theoretical background and research related to SFL in the classroom

The role of language and literacy instruction in discipline specific curriculum areas has been a concern for many involved in the PD of teachers (Humphrey, 2017; Schleppegrell, 2013, 2018). Halliday (1990, reprinted 2010:141) emphasizes that 'language does not passively reflect reality; language actively creates reality'. Disciplinary literacy therefore is more than just understanding the knowledge of a subject, it also incorporates the practices, processes, contents and ways of being and meaning, ways of talking, writing and practices of any particular discipline (Fang & Coatham, 2013; Moje, 2007; Polias, 2016). There is a need to move from generic literacy skills and attend more to the concept of disciplinary literacy, where teachers understand the knowledge and the language of their specific subject area. As Halliday and Martin (1993: 94) point out 'language is the essential condition of knowing, the process by which experience becomes knowledge'. Supporting and sustaining teachers' knowledge of language and strategies which enable them to be explicit about LCL within their discipline and what impact the explicit teaching of LCL has on the learners is at the heart of the present study.

SFL has proven to be a powerful PD resource that can be introduced to teachers and support language and literacy development in school (Brisk, 2015; Humphrey, 2017; Gebhard, 2019). The present study extends work already carried out in Australia (Christie & Derewianka, 2008; Humphrey, 2017; Rose & Martin, 2012) and the USA (Gebhard, 2019; Schleppegrell, 2004, 2013, 2018) that provides evidence of the successful application of SFL by teachers in a range of schools, disciplines and age groups.

SFL research in Australia pioneered the identification of genres as part of the Disadvantaged School Programme (DSP) in the 1980's and 90's and informed the design of genre-based pedagogy, often referred to as the Teaching and Learning Cycle (TLC) (Christie & Martin,

1997; Coffin, 2006; De Silva Joyce & Feez, 2016; Humphrey, 2017; Martin & Rose, 2008; Rose & Martin 2012; Rothery, 1994). SFL has continued to influence the literacy curriculum, the PD of teachers and the development of classroom activities in Australia (see, the overview of ‘literacy’ at www.australiancurriculum.edu.au). Some examples of PD based on SFL is the work of the Primary English Teaching Association Australia (PEETA - www.petaa.edu.au/) along with Christie (2005; 2012), Christie & Derewianka (2008), Humphrey (2017), Macken-Horarik, Love, Sandiford & Unsworth (2017), and Rose & Martin (2012).

Martin and Rose (2008) and Rose and Martin (2012) collate, extend and provide an overview of the work carried out as part of the DSP project. They offer a detailed analysis and clear framework that provide insights into the genres, discourse semantics and lexico-grammatical features found in different disciplines. Building on this and earlier work (see Dreyfus, Humphrey, Mahboob & Martin, 2016), Humphrey (2017) focuses on language, literacy and pedagogy in the middle years (ages 11 to 14 years old) in an inner-city secondary school in Sydney, Australia. Humphrey (2017) provides an outline of a 4 x 4 literacy framework that was introduced in a range of disciplines at one school. The 4 x 4 framework provided a scaffold for teachers and learners by illustrating and discussing language choices at the level of genre (whole texts), paragraphs (discourse semantics), sentence (grammar) and word (lexico-grammar) in relation to register choices (field, tenor and mode – field was divided into experiential and logical meanings). This framework of 4 x 4 was introduced as an intervention model supporting teachers’ and learners’ understanding of how language functions in different disciplines. Humphrey (2017) illustrates how the explicit teaching of language had a positive impact on students’ high-stakes national examinations in literacy and other disciplines.

Similarly, in the USA evidence of the benefit of incorporating SFL metalanguage in PD for teachers to support English Language Learners (ELL – similar to EAL in the UK) has been reported by three key research teams namely: the California History Project led by Schleppegrell and colleagues; Access to Critical Content and English Language Acquisition (CCELA) lead by Gebhard and colleagues; and the work of Brisk and colleagues in Massachusetts. All three teams demonstrate the development and advancement of EAL learners through the ability to access the curriculum, and they all highlight the value of PD for teachers (Achugar & Carpenter 2014; Brisk 2015; Brisk & Ossa Parra, 2018; Byrnes 2012; Gebhard et al., 2014; Gebhard, 2019; Palincsar & Schleppegrell, 2015; Schleppegrell, 2004, 2013). For example, Gebhard et al (2014) and Gebhard (2019) outline how sustained PD for in-service teachers was implemented in a range of classrooms to support ELL’s, and how such SFL PD programmes can support teachers’ cognitive development of genre and language within their own discipline. The CCELA team verify other SFL language education pedagogic research and illustrate how improving the disciplinary literacy of teachers informs the explicit teaching of language for curriculum learning, which then supports improved written texts of ELL writers. In essence, SFL-based PD has encouraged and supported teachers to focus on and explicitly teach how language makes meaning and constructs knowledge in a discipline, which in turn can lead to learner improvements.

A smaller field of research in EFL secondary school contexts, also reports the benefits of SFL in Hong Kong secondary schools (Firkin, Forey & Sengupta, 2007; Lin, 2016; Polias & Forey, 2016), and in bilingual schools in Spain (Llinares & Morton, 2017). In addition, SFL has also been effectively adapted to inform the curriculum and teaching of modern foreign language education in higher education (e.g. Byrnes, 2012; Schleppegrell & Colombi, 2002).

1.2 An Overview of Key SFL Metalinguistic Resources: Register, Nominalisation & Periodicity

At the school where the present study took place, teachers reported that they understood the meaning of register, nominalisation and periodicity, and that they used these metalinguistic resources in their teaching (see Figure 1). Register is ‘a variety of a language that is oriented to a particular context’ (Halliday, 1986 reprinted 2007: 297), and refers to the choices made by a speaker or writer in context with respect to the field (what it is they are talking about), tenor (who it is they are talking to and the position the speaker wishes to take) and mode (the channel of communication) (see Halliday 2010; Martin 1992). Register allows teachers to be explicit with pupils in shifting them along a cline from every day to academic, technical language or vice versa. An understanding of register is a valuable resource for teachers and learners to understand what is valued in a discipline and how to consciously choose and structure language that fits the context.

Nominalisation is one of the essential resources for differentiating register (Droga & Humphrey, 2003; Liardet, 2016). Nominalisation condenses congruent processes into a noun, e.g. ‘we decided that...’ is realised by the mental process ‘decide’; when nominalised a process is packaged into a thing, a noun e.g. ‘the decision’. By congruent, I mean the most straight forward, commonsense, or natural way to express the meaning. Nominalisation involves information being down-ranked from a clause to a noun. In a nominalised form, it becomes less negotiable, since you can argue with a clause, but you cannot argue with a nominal group, e.g. ‘we decided that...’ can be argued with you could say that the ‘we’ is incorrect and not everyone present was involved in the ‘deciding’. However, if the information is packaged in a nominalised form ‘the decision was that ...’ this is presented as something which is factual and less negotiable (see, Halliday & Martin, 1993).

Nominalisation allows for the complex packaging of information and is ‘a mark of prestige or power’ (Halliday & Matthiessen, 2014:657). Halliday adds that the writer knows exactly what is meant, but the interpretation by the reader is more complex due to the non-congruent packaging of information. The use of nominalisation allows the writer to present information in what may appear to be an authoritative manner, and the meaning becomes incongruent, more abstract in meaning, which is often valued academically (Brisk, 2015; Christie 2005, 2012; Christie and Derewianka, 2008; Humphrey, 2017; Schleppegrell 2004).

Periodicity refers specifically to ‘information flow: with the way in which meanings are packaged to make it easier for us to take them in...giving readers some idea about what to expect, fulfilling those expectations and then reviewing them’ (Martin & Rose, 2007: 175). Within the clause, Halliday introduced the concept of Theme (Halliday & Matthiessen, 2014) to represent the point of departure for the clause, i.e. ‘it is that which locates and orients the clause within its context’ (Halliday & Matthiessen, 2014: 89). Martin and Rose (2007) extended Theme to help explain the point of departure for a whole text (macroTheme) or paragraph level (hyperTheme), which signal the message to follow. Derewianka (2011: 143) adds that macroTheme, hyperTheme and Theme are devices ‘that signal text structure and guide readers, for example overviews, initial and concluding paragraphs and topic sentences...’. MacroTheme, hyperTheme and Theme provide metalinguistic resources that allow the teacher and learners to explicitly talk about the organisation of a text, in a clearly defined manner rather than the often-used ubiquitous terms ‘structure’.

2. METHODOLOGY

2.1. The context

This study was conducted between April 2015 to April 2016 at The School in order to review, reflect on and investigate the impact of the whole school language and literacy initiative introduced in 2012. The School had undertaken the initial implementation and was interested in collaborating with a research team to investigate the progress made, improve the impact, further support the PD of teachers, and ultimately improve teaching and learning. The School wished to narrow the literacy gap of EAL and disadvantaged students, and where possible to improve the General Certificate of Secondary Education (GCSE, a national exam for students usually aged 16 years old) and A Level examination results (a UK national exam usually taken around 18 years old and a pre-requisite for university) for all students.

The School has a population of approximately 1,100 students with an age range of 11-18. Students who use English as an additional language (EAL) amounted to 52.3% of the whole population (the UK national average is 15%), 4.5% were designated as students with special educational needs (SEN, the national average is 1.8%), and 41% were classified as Pupil Premium funding (the national average is 29.4%, see www.gov.uk for national averages for 2016). Pupil Premium funding is additional funding designed to close the gap between disadvantaged students and their peers. The need for literacy support for these students was reflected in the less-than-satisfactory, below the national average GCSE results in 2012 and earlier (see Forey & Cheung, 2019 for a comparison of GCSE scores in 2012 and after teachers had taken a 30 hour SFL PD workshop, 'How Language Works').

The School had tried a number of PD initiatives to support teachers to focus on language and literacy. In 2012, the initiative 'How Language Works' (HLW) through a 30-hour interactive workshop introduced SFL and how to explicitly teach LCL within a discipline through the teaching and learning cycle (see www.lexised.com). Teachers who had participated in HLW and had implemented SFL through the TLC volunteered to be interviewed and observed. The present study was driven by both being sensitive to issues related to austerity measures and cutbacks at The School, which were constantly putting teachers under pressure. This resulted in a data collection schedule that fitted with the teachers' schedule without placing any extra burden on those involved. At the same time, the research was driven by the need to offer research that was practical, applicable and directly focused on supporting and improving teaching and learning as well as extending related theory (Schleppegrell, 2013).

Seven discipline specific teachers initially attended HLW and were appointed as 'Language Champions' within The School (see Dare, Custance & Polias, 2010; www.lexised.com and www.hamsteadhall.com/Professional-Learning). HLW was gradually introduced to the whole academy and since 2012, 36 teachers have attended the 30 hours HLW training.

The research was particularly interested in exploring *how* teachers make sense of and use SFL in their classroom practice. The research design mapped the SFL core concepts presented during the 30-hour intensive workshops where teachers were introduced to SFL theory, SFL metalanguage and how to explicitly teach and use SFL within a genre-based pedagogy. The workshop involved modelling and deconstructing what was meant by register, nominalisation and periodicity in a range of educational texts. The teachers were involved in jointly analysing texts, talking about lexicogrammatical and generic features and differences in disciplines across the curriculum, gradually developing their understanding of SFL theory and how it could be applied to understand disciplinary literacy and functionally applied in the classroom. Developmentally, this led to the co-construction of lesson plans and micro teaching where the educational consultant scaffolded the teachers, enabling them to transfer the theoretical concepts into classroom talk and activities. Throughout the workshop, and

after when they returned to the classroom, teachers were scaffolded and became familiar with SFL concepts, ultimately resulting in the operationalising and explicit use of these SFL metalinguistic tools. This exploration of how SFL theory became operationalised reflects the Design-Based Research (DBR) approach.

2.2 The research tools and data

DBR combines theoretical developments with the needs of those involved in the research, i.e. ‘the design of learning environments is further interwoven with the testing or developing of theory’ (Bakker, 2018:3). The present study investigated how the introduction of SFL theory, and SFL metalinguistic concepts led to the explicit teaching of LCL in a variety of disciplines. Findings from the research were both aimed at building theoretical frameworks related to SFL and LCL, and at the same time the data and findings from the present study were of value for the classroom and PD offered to teachers at The School and beyond.

Prior to the data collection process, written consent was obtained from teachers, parents and students, who were assured that any identity-revealing information from the data would be removed. Students and teachers who were mentioned in the present study were given pseudonyms. Where photos are included showing the identity of the individual, permission was approved by the individual involved. As shown in Table 1, the dataset includes approximately 100 students’ writing samples, accompanied by 15 hours of student and teacher interview recording, and 11 hours of classroom observation videotaping. The aim was to not only observe, but also ask teachers and students to reflect and to investigate whether the metalinguistic features were visible in the students’ texts.

Table 1: Data collected at The School

	Interviews	Observations	Documents
1 st Visit April 2015 1 week	Principal (35 mins) Deputy Heads (63 mins) Consultant (62 mins) 5 Teachers pre-obs (154 mins) 5 teachers post-obs (196 mins) 5 student focus groups (99 mins)	English (90 mins) Science (90 mins) PE (90 mins) IT (90 mins) Geography (90 mins) Assembly (20 mins) Design Technology (50 mins)	Model texts Lesson plans PowerPoints Handouts planner Student texts Strategy plans
2 nd Visit, Oct 2015 1 week	Pre & post interviews with observed teachers	Science (50 mins) PE (50 mins) English (50 mins) Geography (50 mins)	Lesson plans PowerPoints Handouts Images

		Assembly (20 mins)	
		Sports performance	
3rd Visit April 2016 1 week	Pre & post interviews with observed teachers. And Learning support teacher	English (50 mins) Science (50 mins) Mathematics (50 mins) PE (50 mins)	Model texts Lesson plans PowerPoints Student texts
Questionnaire (<i>n</i> =83)			
Paper, Research Planning			

The observations were video recorded, the interviews audio recorded, and both transcribed in full. The written assignments were first typed and archived as electronic texts. The research team made detailed field notes, which guided the viewing of the videos which were watched multiple times. The first stage of the analysis involved examining how explicit LCL relating to register, nominalisation and periodicity was shared and negotiated in classroom interaction. This focused on what Gebhard et al. (2014) define as ‘metalinguistic literacy events’, that is ‘any teaching/learning event in which the use of SFL metalanguage was fundamental to the task’ (Gebhard et al., 2014, p. 112). Complete transcripts of each lesson and interview were made, and ‘metalinguistic literacy events’ were identified across all data sets. Based on the findings, register, nominalisation and periodicity were identified as valuable metalinguistic resources and video extracts where these ‘events’ occurred in the classroom were examined in depth. These video extracts were shared with The School and incorporated into future PD sessions.

Drawing on DBR, a key aspect of the PD and teacher’s practice was the use of a graphic representing register, illustrated in Figure 1. The graphic presentation of register was found in a range of different classroom and afforded teachers the opportunity to scaffold the students’ awareness of changes in everyday language towards a technical disciplinary specific language or vice versa.

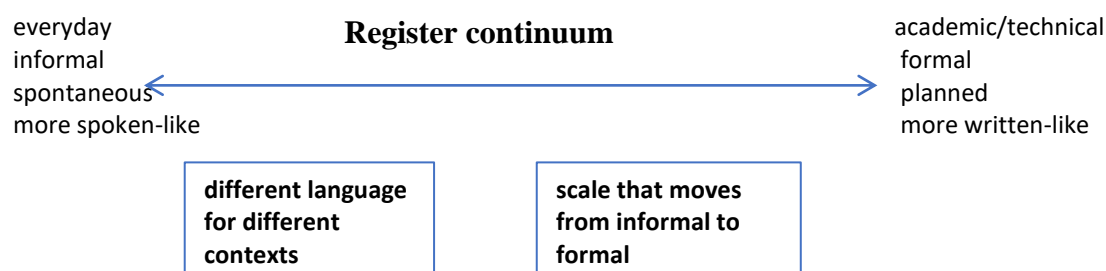


Figure 1: Register continuum or language line

A shift in register was sometimes associated with discussions about technical language and nominalisation was found to be a metalinguistic device referred to when

discussing a shift in register. At a discourse semantic level, the teachers explicitly used the metalinguistic terms macroTheme, hyperTheme/hyperNew, Theme and Rheme to discuss how texts were coherently organised. These three key metalinguistic features were then investigated by examining ideas that emerged in the student and teachers' interviews related to register, nominalisation and periodicity. Finally, the student's texts were also studied to observe the presence and use of these three linguistic features. Collectively, the three stages of analysis sought to understand how the explicit teaching of LCL was carried out and realised in the teaching and learning across disciplinary areas.

3. FINDINGS & DISCUSSION

One of the key points emerging from the analysis was the value, relevance and affordances provided by a whole school approach to language and literacy. In what follows, I draw on different examples of metalinguistic events where register, nominalisation and periodicity were realised in the classroom; bringing together the data related to classroom interaction with teachers and learners' views of these metalinguistic features and the realisations found in student's texts.

In June 2016, all teachers were given a questionnaire and asked which SFL metalinguistic terms they were familiar with and which they actually explicitly used in their classroom.

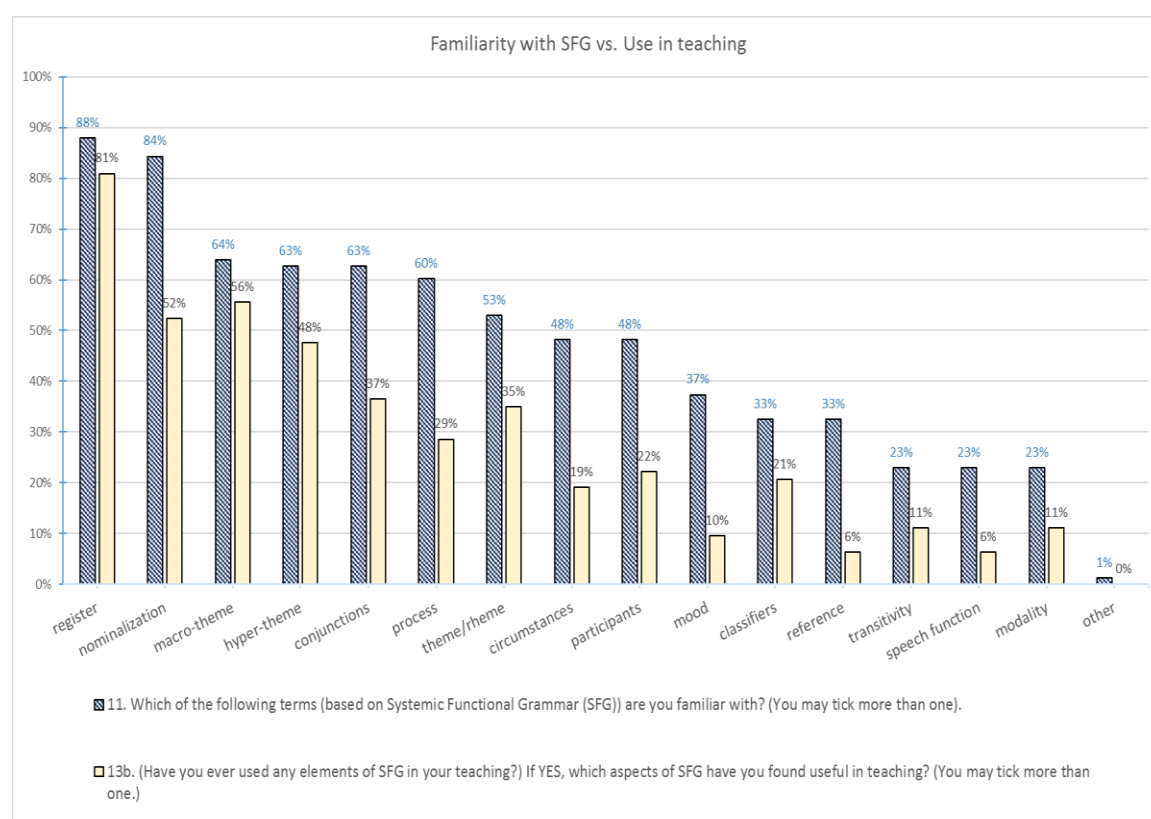


Figure 2: Familiarity and use of Systemic Functional Grammar terms at The School

As illustrated in Figure 2, the teachers reported that they were familiar with register (88%), nominalisation (84%), macroTheme (64%) and hyperTheme (63%) and that they found register (81%), nominalisation (52%), macroTheme (56%) and hyperTheme (48%) were more useful in teaching than other categories. This response mirrors the initial focus in the

PD offered to teachers, which involved attendance at the HLW workshop, followed by support from the Language and Literacy Education Consultant and other PD initiatives. The Language and Literacy Education Consultant's role in The School was initially to collaborate with the Language Champions, to co-plan, co-teach and support the implementation of the explicit teaching of LCL in their classroom. Thus, scaffolding the PD of LCL, the use of a shared metalanguage, and the development of disciplinary literacy. When appropriate, the Language and Literacy Education Consultant reduced the level of support offered as the teachers became confident with the metalanguage, and how to use it to explicitly teach LCL in their classroom, extending the PD far beyond a 'one-shot workshop' approach. However, a discussion of the PD model is not within the scope of this paper.

The questionnaire verifies the findings from the classroom observations and interviews with teachers and students. These findings raise questions about whether specific disciplines have a stronger take up of SFL metalanguage, and questions concerning how teachers use this knowledge in their classroom. In addition, as pointed out by Borg (2018:80) the impact of PD on teacher's beliefs and practices 'will vary across contexts depending on teacher profiles' (e.g. motivation, prior beliefs and experience and professional needs). It may be possible that some teachers drew on previous teaching experience and adopted the SFL innovative approach to ratify existing teaching practice, e.g. the use of genre templates to inform models of writing; or the recontextualisation of SFL concepts to support a more traditional language teaching approach. However, from the methodology adopted, and based on data from classroom observations, interviews and student texts, the findings suggest that the use of SFL metalanguage did promote an explicit discussion of language and how it makes meaning. In addition, explicit teaching of LCL as a whole school approach highlights generic and lexicogrammatical similarities and differences within and between the disciplines. Ultimately, the explicit use and sharing of SFL metalanguage appears to have had a positive impact on teaching and learning at The School. In discussing the findings, I start with how the metalinguistic resource of 'register' was being used in different disciplines, before moving on to discuss nominalisation and periodicity.

3.1 Register: Negotiating language use in the science classroom

The explicit use of register as a metalinguistic meaning making resource was a whole school phenomenon and widely shared across disciplinary subjects with visual or other semiotic representations of the register continuum found in almost every classroom. Teachers and students often referred to register as the language continuum (or 'language line') spanning from concrete / common sense to abstract / technical (see Fig.1 1). In the observed classrooms, variations in the register were usually emphasised through a discussion of field, i.e. disciplinary lexis, technical versus commonsense meanings; mode, i.e. the channel of communication and organisation of the message; while tenor and the negotiation of self/other positions within a text were less frequently discussed (see Forey & Polias 2017, Gibbons, 2014; Polias 2016 for a detailed discussion of register in the classroom). When interviewing the students and observing lessons, it was clear that students were able to explicitly discuss and identify register choice within and between disciplines. Students were able to articulate that different disciplines called on different registers. As summed up by a Year 7 (11-12 years old) student *'in science we do formal language, but in geography we do, do formal language, but it's more like how a geographer would use it'* (Student Interview, April 2016). This supports Schlepppegrell's (2018) position that students can develop a familiarity with and a cognitive awareness of discipline discursive practices.

In many classrooms at The School, the register continuum was visually presented as a fixed visual image for students to refer to and often tasks were based on understanding language

choices and constructing different registers, as shown in Figures 3 and 5. In a Year 10 (14-15 years old) physics class, the science teacher (SciT) used a simple register continuum presented as a cline from 'everyday' to 'academic' language use, as shown in Figure 3.

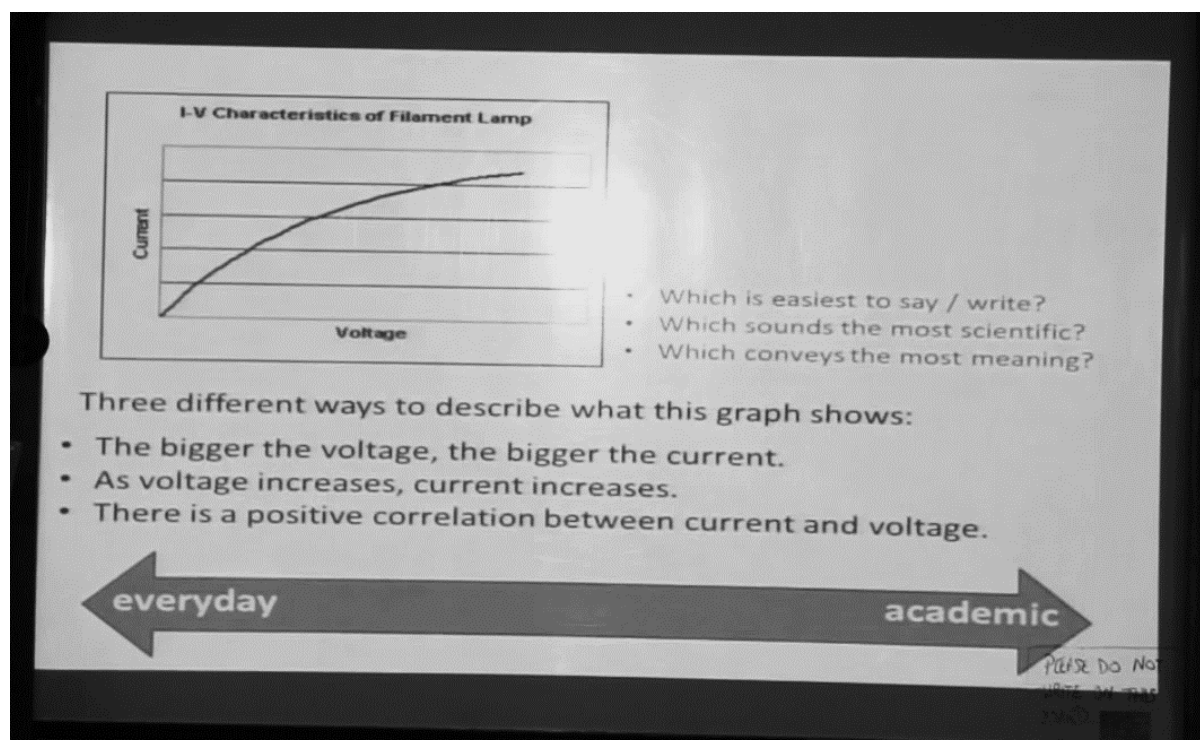


Figure 3: Interpreting a graph: differences in language use along the register continuum

The students were asked to discuss which of the three statements was *the easiest to say / write? Which sounds the most scientific? And, which conveys the most meaning?* They were also asked to place the three clauses on the register continuum.

The students discussed the register of the three declarative clauses in detail. These clauses also acted as a model for drafting a later task where students had to interpret a graph (see, Figure 4). The science teacher (SciT) pointed out that the three clauses conveyed the same meaning, and the language choice shifted along the register continuum sounding more formal and academic. The SciT also asserted that the complexity in language use in relation to scientific, technical writing did not necessarily correlate.

(1) Classroom transcription: Explicit teaching of register in the Science classroom

- SciT: We call it the register continuum. Continuum because it is the line continuing that way and continuing that way. This is everyday language [POINTING AT THE LEFT OF THE CONTINUUM]; this is academic language [POINTING AT THE RIGHT OF THE CONTINUUM]. Think about where you'd put each of those statements. Which one of the uh statements will go to the everyday side?
- Student: The first one going to the left...
- SciT: Similar order () from left to right? (1.0)
- SciT: Alright. How far is that to the left? Is it all the way to the left?
- Students: [Yeah
[No... just a bit to the right

In the classroom interaction shown in Extract 1, the students were asked to identify where the three statements would be placed on the register continuum. At first, they decided that the first statement was to be juxtaposed on the left (more everyday language); they negotiated its position to be *just a bit to the right*, instead of *all the way to the left* as the teacher had prompted. This interaction suggests that the students went beyond imitating what the teacher had demonstrated, as they were able to recognise the degree of technicality found in each of the statements. The teacher here was explicitly raising awareness of register by comparing more everyday language such as *the bigger the voltage the bigger the current* compared to a more technical register of *there is a positive correlation between current and voltage*. In the science classroom, students were given a task where they engaged in a discussion, examined language and its meaning. This task raised awareness of how to manipulate language choice, how register shift happened, how key concepts were recycled and how the students prepared independently to write like a scientist, at a later stage, as shown in Figure 4.

The Science Teacher explicitly highlighted that the choice of language was dependent on the tenor by discussing what language should be chosen in an exam, compared to talking to scientists at a conference. He provided an answer 'I'd choose the middle one as it's quicker, unambiguous, clear and uncomplicated'. This short extract represents how the Science Teacher explicitly taught LCL in the science classroom by raising the students' awareness of language use, and explicitly modelling and deconstructing language choice and meaning through the use of the metalinguistic resource of register. Such explicit teaching of LCL was a common occurrence in the science and other disciplinary classrooms.

The lower the voltage the higher the temperature
 As the resistance decreases the temperature increases
 There is a negative correlation between the temperature and the resistance

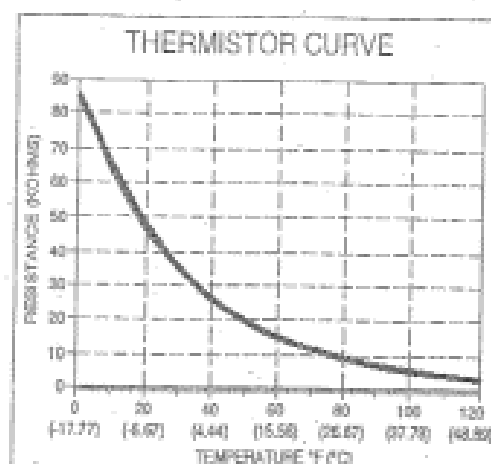


Figure 4: Student's interpretation of a graph (Year 9)

The student's written output in Figure 4 mirrors the modelling and deconstruction which was previously introduced in the same lesson by the teacher. The three sentences moved from more spoken-like language towards more technical, scientific writing, while conveying the same meaning regarding the relationship between resistance and temperature. The first statement presents congruently construed observations, where the sequence of the clauses implies the causal relationship (*the lower the voltage (is)|| the higher the temperature (is)*). The second statement recovers the processes and is linked through the conjunction 'as' e.g., *As the resistance decreases, || the temperature increases*. In the third statement, the two clauses are condensed into one clause, *There is a negative correlation between the temperature and the resistance*. The clausal relationship construed the nominalisation *a negative correlation* and the circumstantial adjunct of place (*between the temperature and the resistance*) represents the relationship between *temperature* and *resistance*. The writing task represents a shift in register from an informal, concrete construal of scientific observation, towards more abstract technical scientific writing. The students recycled their understanding and language that was introduced to them previously to successfully demonstrate language choice when interpreting graphs. At this point, it may appear that the student text (Figure 4) is similar to the teacher's model in Figure 3. However, the student has successfully and independently produced this text in working with a new graph focusing on different information. As highlighted by the science teacher *the metalanguage certainly empowers me to talk to students about language in a way I wouldn't have done before*. (Science Teacher, April 2015). In the same interview the Science Teacher also stated that the students:

A. Interview with Science Teacher

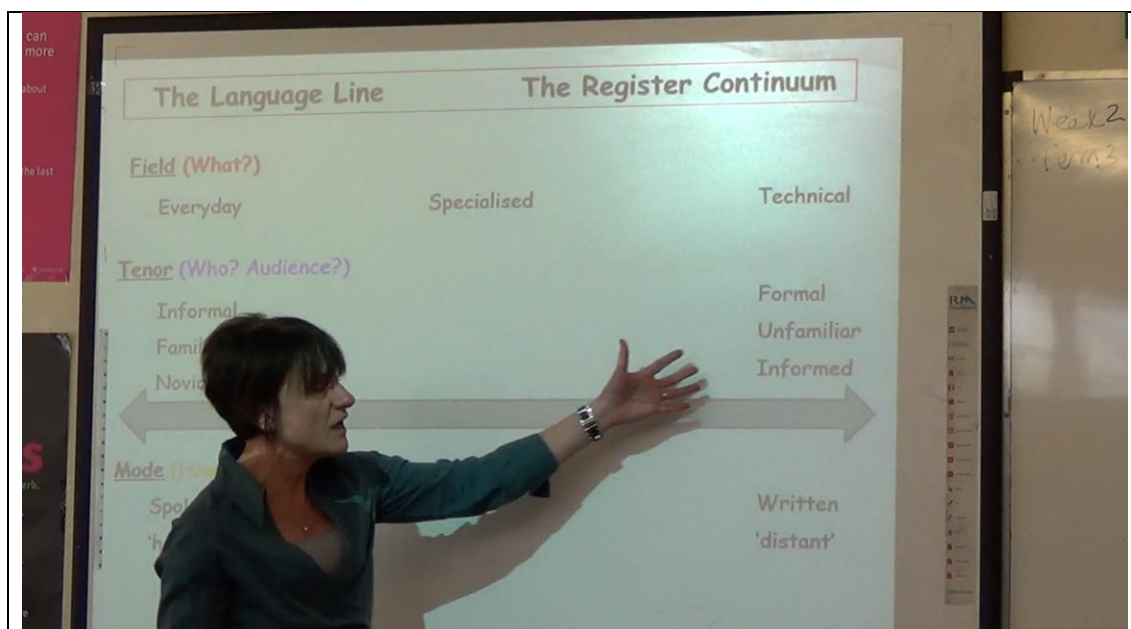
not only produce texts independently in the focused genre by the end of this cycle but they're also given the tools to assess what they've done so they can be self-critical, and they can give themselves advice about how to improve which is great!

(Science Teacher, April 2015).

Extract A represents the sentiment of many staff at The School that the linguistic tools they were providing through SFL metalanguage were beneficial to students within their discipline and beyond the narrow boundaries of high school examinations.

4.2 Register: Negotiating language use in the English literature classroom

In the English literature class, the English Teacher (EngT) used a similar task to the science lesson. The English Teacher prepared three paragraphs based on exactly the same field, which was a character description. Each of the three paragraphs was printed on a different colour paper (blue, orange and white) to help with the discussion. She introduced the task, which was to read, analyse and place these three texts on the register continuum, as illustrated in Figure 5.



Eng T: *In this envelope, you've got three paragraphs. It's the same paragraph written three times. And, what I'd like you to do with your partner is read the three different versions of the paragraph and decide where you would put each of them on the register continuum. So where would you put them and why? Which would be the one furthest to this side [pointing at the left hand side of the register continuum] is one of them in the middle? [moving and pointing to the middle of the register continuum] or are they all over here? [pointing to the right-hand side of the register continuum, as above]. Where would you put them and why?* (English Teacher)

Figure 5: Register in the English literature class

As shown in Figure 5, the English Teacher clearly presented the register continuum and highlighted field, tenor and mode on the PowerPoint slide. The students discussed the language choices of the three paragraphs, they placed each on the register continuum and provided a justification to support their decision. This task explicitly required students to discuss, reflect, engage and explain the difference between every day and technical language choices and the meanings made. The discussion between the teacher and students is shown in Classroom Interaction 2, where a focus on the explicit discussion of language choice and register can be identified.

(2) Classroom Interaction: Discussion of language choice and register

EngT: ... what we need to do is not just look at the number of words, but what kinds of words are they. So, we need to look at the words as well. [FS3]?

S: First I've thought the blue one would go at the end, but the white one... but the blue one says "Kitty is passionate"; the white one says "Kitty is presented as a passionate character"... so it's got more detail and unfamiliar words

EngT: OK so the difference between the... "Kitty is passionate" and "Kitty is presented as a passionate character" those were the key things that make you change your mind on that one. That's very nicely explained with some good evidence. Good

In Classroom Interaction 2, students compared the two clauses *Kitty is passionate* and *Kitty is presented as a passionate character* and identified that the second clause *presented as a passionate character* has more detail and unfamiliar words. The teacher affirmed the

student's response by stating *that's a very nice way you explained with evidence*. The teacher's approval reflects the students' awareness of the register shift, the focus on a more literary linguistic explanation and the shift to include a more abstract attributive process such as *is presented*. The use of passive here infers that the characterisation is directly linked to the author who is doing the presentation of 'characters'. This supports the teacher's encouragement to consider the *kind of words* chosen, the meanings made and to link the character development to the author's intention.

In English and other observed classes, the register continuum was used to focus attention and to discuss how language makes meaning in different ways in different disciplines in spoken texts. The register continuum and SFL does not valorise written language over spoken language, but rather provides a starting point for teachers and learners to discuss language choice and meanings made in a specific context in different disciplines (see, Forey & Polias, 2017; Polias & Forey, 2016; Schleppegrell, 2018). For example, register was used to identify meaning making in the English classroom for presentations, in the PE classroom for the descriptions of performance and in an assembly with respect to greetings and casual conversation. Register appeared to be a useful SFL metalinguistic resource commonly used by teachers and students in the explicit teaching of LCL.

4.3 Nominalisation: Abstracting congruent phenomena building technicality in PE

There were many examples where the teacher focused on nominalisation as a way of shifting the register. For example, students were asked a question such as, 'What's the nominalised form?' as shown in the Classroom Interaction 3, from a Y11 PE Theory class.

(3) Classroom interaction: Focusing on nominalisation in the PE theory class

PE T: Can we change 'apart from' into a more technical way?

S: Except from

PE T: Right, yeah, great, except from is a great word. What's the nominalised word of except? So instead of saying to except, what could we say? ... What did we do with conclude and conclusion?

S: You turned it from conclude to conclusion

PE T: So, what, so

S: Exception

PE T: Right, so how can we get exception in here...?

The teacher had modelled a text earlier and nominalised a process *conclude* to the nominalised form *conclusion*. As shown in (3), the teacher and student understood the shared metalanguage *nominalised* and the student was able to reply with the grammatical metaphor *exception*. In addition to using explicit metalanguage, a more commonsense use of metalanguage was also acceptable and understood by both parties, as shown in Classroom Interaction 4.

(4) Classroom interaction: Focusing on nominalisation in the PE classroom

PE T: So how could we make...what is it here? Saying "to be good at playing sports, you would need." How in the first paragraph, is that made is that being written more academically? So, to be good at playing sport, you need to have...?

S: desirable characteristics

PE T: [Yeah] So desirable characteristics is another way of saying the things you need to be good at in order to be good at sport, isn't it?

Here the teacher uses less technical metalanguage and asks the students to provide a response that is *written more academically*. The term *written more academically* directly related to the register continuum that the students and teachers are familiar with and is a metalinguistic term in itself. The student demonstrates a working knowledge of register, and easily shifts the language from a more congruent form *to be good at playing sport* to a nominalised more academic choice *desirable characteristic*. Such explicit teaching of language was common in all of the classrooms visited during our data collection. In addition, the fact that the whole school shared a common metalanguage provided affordances for teachers and learners to talk about language and make choices that reflected the context. For example, when giving a presentation the teachers would talk about *the language being at the left hand side of the register continuum* (PE T) and *if you're in an exam, you want to get full marks, you use language more at the right end of the continuum* (SciT). This further extends the argument presented by Christie (2005, 2012), Christie and Derewianka (2008), Humphrey (2017), and others highlight the value of nominalisation and that nominalisation is one indicator that can lead to improved writing and higher grades for elementary and secondary school students.

3.4 Periodicity: Explicitly teaching information flow

Textual organisation in terms of periodicity was also a key feature that was explicitly taught in LCL in different disciplines at The School. Periodicity was often taught both at a text and clause level. At a text level, the focus was on the hierarchical structuring of a text from the macroTheme, hyperTheme, Theme, New, hyperNew and macroNew. At a clause level the learning objectives were to understand the relationship between the choice of Theme and organisation within the clause, i.e., the relationship of what comes first, and what follows the choice of Theme; and how such choices impacted the meanings made and the cohesion of information within and between clauses. Theme, both at a text and clause level functioned to regulate the flow of information in the text (Forey & Sampson 2017). The explicit teaching of textual organisation was undertaken throughout a range of subject areas that were observed. I highlight the explicit teaching of periodicity by discussing examples from the PE class. A model text, that the teachers had written, was deconstructed to reveal how information was organised within the text, as outlined in Figure 6. In addition, interviewee reflections on the use and value of periodicity are included to demonstrate the metacognitive awareness of both teachers and learners. Data from joint construction where the teacher explicitly taught thematic progression in the geography class is used to illustrate the teaching of periodicity (see Fig. 7). Finally, students were able to independently produce their written assignments where they were consciously considering information flow.

3.5 Periodicity: Modelling and deconstructing information flow in the PE theory class

A model text is used to deconstruct the textual organisation in a Year 11 (aged 15-16 years old) GCSE PE theory class. The teacher explicitly taught the hierarchical structuring of longer texts and how to write an answer to a six-mark question. A six-mark question is one of the highest scoring items in a PE GCSE written examination, i.e. a short essay question (see Forey & Cheung, 2019). The six-mark response required the students to discuss ‘optimum weight’ and ‘factors that have an impact on body weight’. The teacher started by introducing an exemplary text and using highlighters to map the hyperTheme and organisation of the text, as shown in Figure 6.

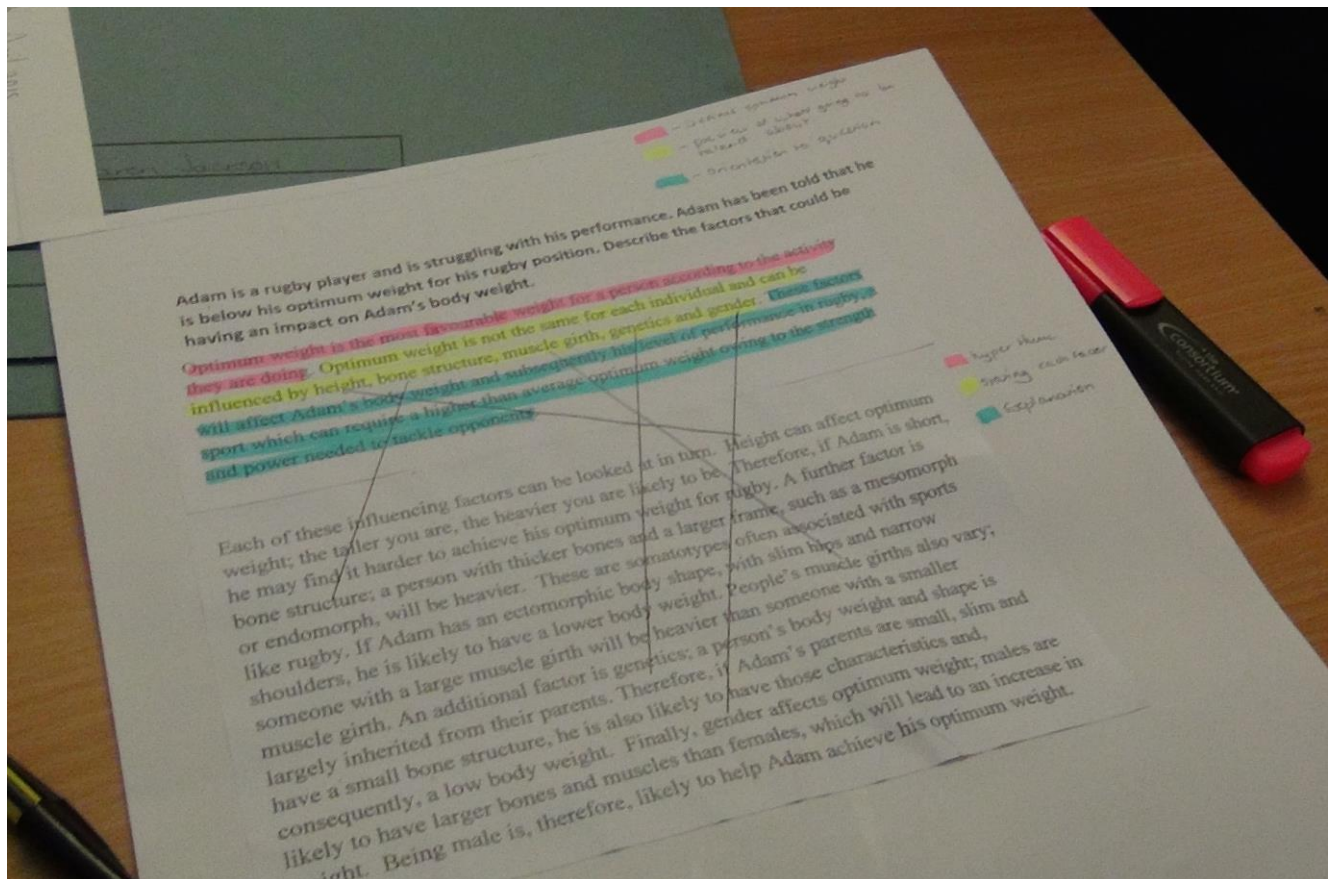


Figure 6: hyperTheme and Theme in a PE model text

As illustrated in Figure 6, the student included a key as a reference for his analysis of the text. The yellow highlighted section is the hyperTheme, pink highlights the definition of the key term, and blue is the explanation. Highlighters and other interactive tasks where students are physically or verbally involved in explicitly discussing, unpacking, identifying and raising awareness of language choices and the meanings made were common at The School. These highlighted texts (accompanied by a key) were archived and could be referred to later as a scaffold when students were writing or revising independently.

In the focus group interview, the PE students were able to share their understanding of the role of macroTheme and hyperTheme, and the role it played in organising their texts, as shown in Extract B:

B. Interview with PE students

1. Researcher: Okay. How about these hyperThemes, and macroTheme?
2. S1: I find that simple.
3. S2: It's simple and we've done that in history.
4. S3: We did that last year as well.
5. Researcher: Are they useful to you?
6. Ss: Yeah yeah yeah.
7. S3: Yes very.
8. S2: For the structure of the
9. S1: Paragraph
10. S3: Yeah.

11. S4: Like it tells you and the person who is reading it. It kind of tells you what's gonna happen. So, you already know.

(Focus Group Interview, Oct 2016)

In this interview, the students were confident that macroTheme and hyperTheme assisted their writing. They were unanimously positive when responding that it was *useful*. They also pointed out that it was *simple* and that the choice of Theme helped them to understand the organisation and predictive nature of a clause.

The use of the term 'hyperTheme' in the classroom to explain textual organisation is represented in Classroom Interaction 5.

(5) Classroom Interaction: Discussion about the function of the hyperTheme
(Year 10, PE Theory Class)

PE T: We're gonna try a bit to jointly construct some better answers. But first of all, I'll read this to you:

[The teacher reads aloud the start of the model text, enabling the students to understand the pronunciation of each word and the rhythm of the text]

"One way to reduce the risks in sport in order to maintain physical health is by wearing protective equipment and clothing. In cricket, a batsman wears a helmet to absorb the impact of a bowler's delivery directed at their head. This reduces the chance of concussion."

PE T: OK. So, when you write in paragraphs, what is the first sentence of that paragraph do? What do we call it?

S1: HyperTheme

PE T: A hyperTheme. What does the hyperTheme do? What does it have to do?

S2: Introduce what you're talking about

PE T: Introduce what you're talking about. In this case, what does it introduce?

S3: About cricket

Classroom Interaction 5 focused on explaining the textual structure of a model six-mark response. The students identified the hyperTheme of the text and explained its function (*introduce what you're talking about*). The teacher then continued to elaborate the nature of hyperTheme, and that it generalises the topic before it is developed. The teacher followed this with *functional questions* that would help students to identify the relevant hyperThemes in the model text. The response from the student that the hyperTheme tells us 'about cricket' is not completely accurate as the hyperTheme informs the reader that the text is about 'protective equipment and clothing in sport', cricket is given as an example. The teacher reinforces and provides more information later about the hyperTheme later. One task teachers use at The School to discuss hyperTheme is asking students to highlight the hyperTheme and link this hyperTheme to other thematic choices through colourful highlighting and arrows creating an map of the flow of information, as shown in Figure 6.

3.5 Periodicity: Jointly constructing a sequential explanation in geography

Textual structuring at the clause level was found in many of the observed classes. Drawing on an example from a geography lesson, I discuss how the students were explicitly taught a sequential explanation (Martin & Rose, 2008; Polias, 2016). Figure 7 illustrates one of the student's written texts, where the student highlights the relationship between the thematic choice and the previous clause. The co-constructed text involves a sequence of processes of the 'nutrient cycle', where each clause represents one process in the cycle. The new information resulting from each process becomes the thematic component in the subsequent clause, forming a 'zig-zag' thematic patterning across the text. Figure 7 includes the student's handwritten text on the right, which has been transcribed in order to illustrate the connection between the choice of Theme. The colour highlights in the text represent how the new information in the Rheme is picked up by the Theme in the adjoining clause:

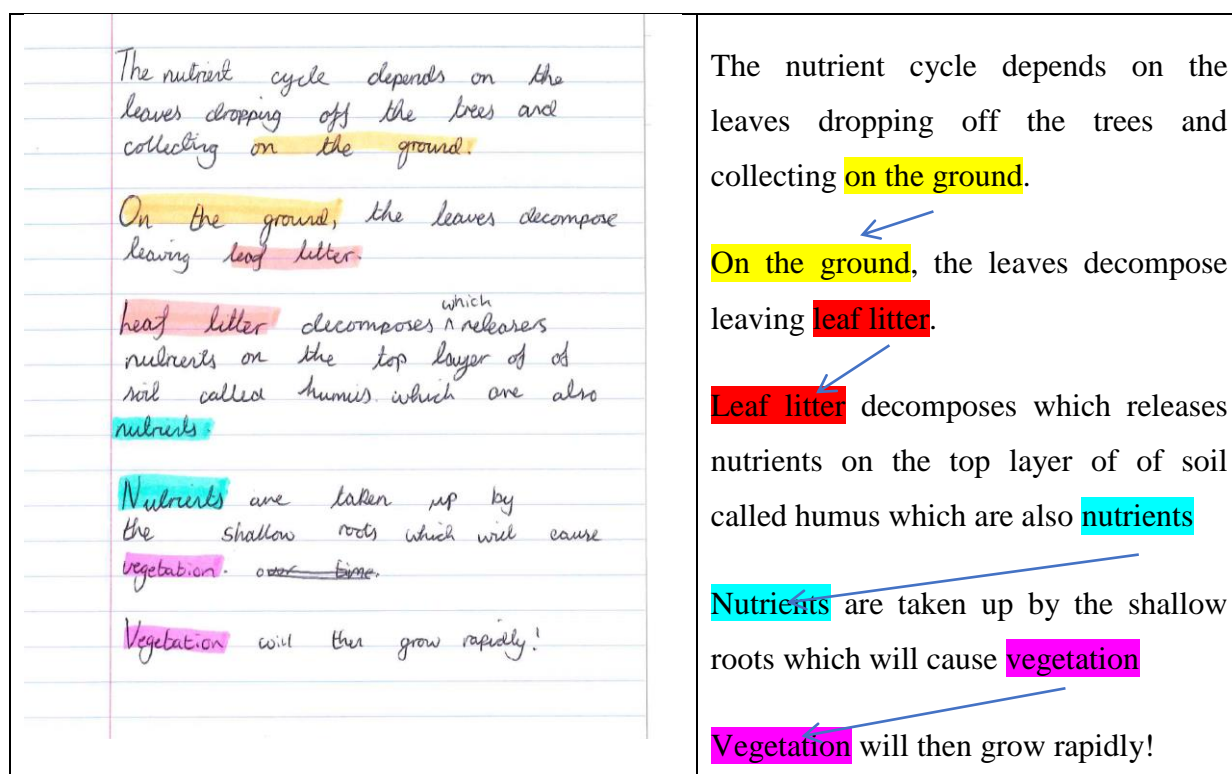


Figure 7: Student sequential explanation of 'the nutrient cycle' (Student LR, Year 8)

As shown in Figure 7, most of the highlighted elements function as topical Themes, introducing the main idea of the sentences. One exception is the circumstantial adjunct of place, (a prepositional phrase) *on the ground*. As there is something other than the Subject of the clause in initial place this is referred to as 'marked Theme' (see Forey & Sampson, 2017 for a full discussion of Theme). The marked Theme functions to interrupt the more predictable (unmarked) patterns of Theme, and emphasises certain information, i.e. in this case, the processes of the nutrient cycle are mainly undertaken *on the ground*.

This zig-zag thematic organisation, while only being one of the many choices available, creates a cohesive flow of information. In addition, the thematic elements represent the condensation of explanation sequences into technical terms, further contributing to the technicality of the text. It should be noted at this point that the explicit teaching of LCL is not seen as a list of vocabulary or supplementary language features that are added on to the curriculum, but that it is an integral feature of the class.

The above example shows how the processes involved in a natural phenomenon can be connected through thematic progression. Therefore, jointly constructing this text allows the teacher to explicate how such a sequence of processes can be implied in the form of a sequential explanation. As Martin and Rose (2008, p. 155) point out, the implicated sequence can also be established through lexical relations. This means students can write longer, coherent texts without being restricted to formulaic expressions, or explicit textual and logical signposts (e.g. *firstly*, *next*, *then*, etc.). In the post observation interview, the geography teacher (GeogT) stated that teaching prosody through hyperTheme and Theme, along with other meaning making resources, had substantially improved students' writing, as shown in Extract C.

C. Interview: Geography teacher's reflection on teaching text structuring

GeogT: ... And that goes to the last two years, particularly last year [2015] which the marks were so much higher because we applied the basic structure to them [GCSE essay questions] and said, "this is how you are to write them." So, most of the pupils were able to follow the format... and [this] gave them something to work towards... and the difference is staggering compared to what... there is the model text. Follow that strategy but apply the correct information to it.

Interviewer: With marking, did it reduce your workload, or did it change your perception of the effect of what you were doing?

GeogT: Yes it changed. The workload hasn't come down; it's just that my comments and my advice to them is much more focused and probably more useful to them. And I can see immediately where they are going.

In addition to the students' improvement in writing, as shown in Interview B, Theme as a metalinguistic resource provides an affordance for the teacher to offer focused and directed feedback rather than a general comment such as 'improve our structure'. Such generalised comments as 'improve your structure' assume that the students can rectify the writing issues themselves. The students were given explicit knowledge to understand the requirements for achieving a higher grade in their written assessments through the coherent explicit realisation of the importance of macroTheme, hyperTheme and thematic patterning, and thematic progression.

As stated by the teacher, explicitly teaching the hierarchical structuring of texts allows students to produce longer texts, which unfold in a more predictable manner. The more predictable writing also organises meanings in waves of information. Disciplinary knowledge is first contextualised and exemplified in classroom teaching, and eventually abstracted and consolidated in high-stake tasks such as the speaking and writing assessments found in school examinations.

4. REVIEWING THE IMPACT ON GCSE EXAMINATION RESULTS

Academic written and spoken texts illustrate and demonstrate disciplinary knowledge, and it is the use of appropriate lexicogrammatical choices where the register reflects the context and the discipline, which is academically valued, assessed and graded. The predominant form of assessment at secondary schools at the age of 16 years in England and Wales are GCSEs. These assessments are key to access to further academic study and often an initial screening process gatekeeping who can continue to study high stakes 'more academic subjects'. The

GCSE examination tends to be assessed by written assignments, hence the focus on writing in schools. The linguistic features that the teachers explicitly taught were register, nominalisation and periodicity. Christie and Derewianka (2008) have identified these as key resources that impact a student's writing development. The findings suggest that based on the observed classroom interaction, teachers' and learners' reflections from the interviews, that the students' written output and the GCSE results in the consecutive years (2014-2016), the explicit teaching of LCL and the use of SFL metalanguage appears to have had a positive impact on both teachers and learners. In addition, from 2014 – 2016, as shown in Table 2, the GCSE results have improved consistently for all students, both those for whom English is the first language and EAL learners. The pass rate of the percentage of all students obtaining a pass at a Grade C to A* (the highest grade) has improved from 44% to 62%. The accumulative increase for EAL (42% to 61%), Disadvantaged (40% to 57%) and L1 English learners (48% to 64%) could perhaps be attributed to the whole school language and literacy initiative that is finding more traction and coherence across the curriculum with the increased PD of a larger number of teachers. This critical mass provides the opportunity for the relationship between language, knowledge and meaning making to be constantly reinforced in a range of disciplines.

The A-A* grades have improved for all learners, and in particular, those from disadvantaged backgrounds. As shown in Table 2, in 2015 15% of disadvantaged students achieved A-A* and this increased to 20% in 2016. The students classified as Disadvantaged are those who receive premium pupil awards from the government.

It is highly likely that the results have also been influenced by other variables that may have affected the outcomes of the reported results. Other influences could perhaps be that increased success attracts 'better' students, or there is a variation in the cohort year by year, or a range of other variables.

5 A* - C incl English & Maths	2014	2015	2016
All pupils	44%	56%	62%
First Language - English	48%	56%	64%
Disadvantaged	no information	40%	57%
First Language - Other	42%	56%	61%
3+ A*/A			
All pupils	11%	13%	23%
Disadvantaged	no information	15%	20%

Table 2: GCSE School Results

At The School, the student body and examination system has remained constant; the main change during this period has been the growing number of teachers who have attended SFL PD, the explicit teaching of LCL and the use of SFL metalanguage across The School.

The data also shows that a variety of disciplinary teachers are using SFL metalanguage and explicitly teaching LCL in their classroom. The extent and overall frequency of use by the whole school is not available at present. Data from the subjects of science, English literature and physical education show a more frequent deployment of technical terminology, with

reference to register, nominalisation and periodicity. The interview and classroom observation data also suggest that the SFL metalanguage taught in the classroom provides a link for the students to be more aware of the relationship between knowledge, language and how the choice of language makes meaning. The explicit instruction of language appears to be beneficial to the students' progression in learning, as well as their preparation for high-stake assessments, such as the GCSE examinations. However, further research is necessary to investigate the extent to which SFL is realised in a wider range of disciplines. It would also be useful to discuss the PD model in more depth and the change management practice that appeared to be successful in The School. A longitudinal study following students who had experienced SFL at school and how this impacted their life beyond school would also be interesting. Another limitation of the present study was that teachers who were to some extent resistant to the introduction of SFL into their classrooms were not interviewed or observed.

5. CONCLUSION

Drawing from some of the data and focusing on three key metalinguistic resources used to explicitly teach LCL, this paper illustrates how teachers used register, nominalisation and periodicity in a range of disciplines and to some extent the impact this had on learning. Following Humphrey (2017), the findings demonstrate how a whole school can adopt a functional approach to language and SFL metalanguage in order to support teaching and learning. SFL afforded a shared metalanguage and a shared talk about language and meaning for both the teachers and students in order to identify and discuss the linguistic patterns and appropriate choices within the context of a discipline. The findings from the present study corroborate Humphrey (2017), Gebhard et al (2014), Gebhard (2019) and others who highlight the positive impact of the explicit teaching of language for curriculum learning and the use of SFL metalanguage to illustrate genre, discourse and lexicogrammatical similarities and differences in a range of disciplines.

At The School, teachers were able to explicitly teach the language of their discipline, and teachers and learners were able to discuss disciplinary meaning using an SFL metalanguage and to transfer the knowledge about language to the various tasks, written and spoken, within the discipline. Focussing on the explicit teaching of LCL, learners also appeared to be able to recognise spoken versus more written-like register and shift register from congruent to more abstract, incongruent meanings or vice versa, to use nominalisation and periodicity to improve their academic texts. The use of these linguistic and discursive patterns afforded opportunities for the students to write/speak effective texts and provided them with linguistic tools that will be valued beyond the years of schooling.

The findings show that teachers can confidently and comfortably use SFL metalanguage, explicitly teach LCL across the curriculum and negotiate with the students how knowledge is constructed through language in different disciplines. Teachers can also employ metalanguage to provide functional feedback on written/spoken output that is based on meaning which can be revised and edited beyond grammatical or mechanical accuracy. Such feedback can also function as guidance for teachers to track students' development, and scaffold language and literacy that provides access to curriculum learning. It would be worthwhile to investigate further how teachers make sense of SFL and how SFL tools support EAL and disadvantaged students in school and beyond. In order to uncover such insights, there is a need for a methodologically rigorous and contextualised analysis of how SFL theory can be more directly applied in education. Research related to teacher, learner cognition and practice (see, Borg 2018), in this case the interpretation and use of SFL

metalanguage in schooling, would also be a relevant area worthy of research. The present study has provided a brief overview of how SFL metalanguage has afforded an explicit discussion of language and meaning in a range of disciplines across a whole school. The approach to language, the PD offered and the scaffolding of PD provides a model of a whole school approach to effective language and literacy that would be applicable to other educational institutions at primary, secondary and tertiary contexts in the UK and internationally.

The Design-based Research illustrated the relationship between theory and practice, i.e. how SFL has been realised in the classroom; how teachers and learners' view SFL; and to some extent, whether realisations were found in learners' written output. Further research that investigates how SFL theory and metalanguage can be more practically applied and easily accessible for teachers and learners across the curriculum would be beneficial.

To finish, a word from a student who went on to university and who will be using hyper and macroThemes in writing at university and beyond. This note started (Fig. 8.), Dear Teacher (the teacher's name) ...

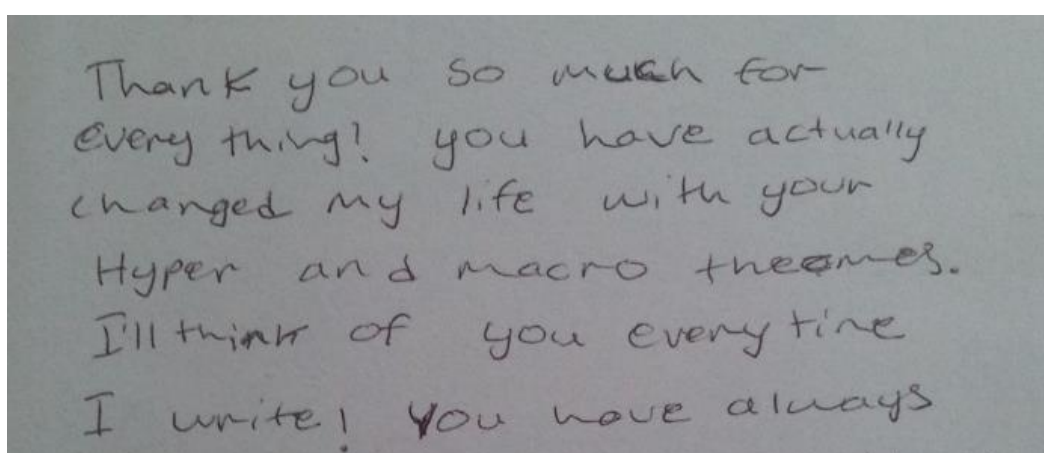


Figure 8: Thank you

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